REMARKS

Claims in the case are 24-50, and 52-55, upon entry of this Amendment. Claims 24, 26, 31, 37, 40, 43, 47, 50, and 52 have been amended, no claims have been added, and no claims have been cancelled herein.

Claim Amendments:

Claim 40 has been amended herein to replace "protective layer" with --overcoat layer--. Support for this amendment to claim 40 is provided by claim 24 from which claim 40 depends.

Claims 43 and 47 have been amended herein to replace "protective coating" with --surrounding structure--. Support for this amendment to claims 43 and 47 is provided by the specification as a whole, and, more particularly, by paragraph [0075] on page 17 of the specification.

Claim 50 has been amended herein to replace "sacrificial material" with --sacrificial layer--. Support for this amendment to claim 50 is provided by claim 24 from which claim 50 depends.

Additional amendments to the claims will be discussed further herein below.

Claim Objections:

Claims 24-55 stand objected to for the reasons discussed on pages 2 and 3 of the Office Action. The claims have been amended herein to address one of the objections thereto, by replacing "a an overcoat layer" in claim 24 with --an overcoat layer--.

With regard to the objection as to recitations of "thermally decomposable sacrificial layer" and "sacrificial layer," Applicants respectfully submit that recitations of "sacrificial layer" alone, which are made subsequently to the initial recitation of "thermally decomposable sacrificial layer," are not objectionable because such recitations are clearly: associated with "thermally decomposable sacrificial layer"; and distinguishable from recitations of other layers, such as "overcoat layer," as would be recognized by a skilled artisan.

In light of the amendments herein and the preceding remarks, the objections to the claims are believed to have been addressed and overcome.

Indefiniteness Rejection:

Claims 26, 31, 37, and 52 stand rejected under 35 U.S.C. § 112, second paragraph. In light of the amendments herein and the following remarks, this rejection is respectfully traversed.

Claim 26 has been amended herein to replace "protective layer" with --overcoat layer--. Support for this amendment to claim 26 is provided by claim 24, from which claim 26 depends.

Claims 31 and 37 have been amended herein to replace "sacrificial material" with --sacrificial layer--. Support for these amendments to claims 31 and 37 is provided by claim 24, from which each of claims 31 and 37 depends.

Claim 52 has been amended herein to replace "the first overcoat layer" with --the overcoat layer--. Support for this amendment to claim 52 is provided by claim 24, from which claim 52 depends.

In light of the amendments herein and the preceding remarks, Applicants' claims are believed to particularly point out and describe the subject matter which they regard as their invention. Reconsideration and withdrawal of the present rejection are respectfully requested.

Anticipation Rejection:

Claims 24-26, 30-36, 40, 50, 52, and 55 stand rejected under 35 U.S.C. § 102(e) as being anticipated by United States Patent Application Publication No. US 2003/0183916 A1 (**Heck et al.**). This rejection is respectfully traversed in light of the following remarks.

Heck et al. discloses packaged microelectromechanical systems that are formed by: applying thermally decomposable layers (15, 25) over a semiconductor structure (12) so as to cover a microelectromechanical system device (18); forming a cover (20) over the thermally decomposable layers (15, 25); making the cover (20) porous; thermally decomposing the thermally decomposable layers (15, 25) such that the thermally decomposed layers **pass through**

the porous cover (20) to form a cavity (22); and applying a sealing material (34) over the porous cover (20) so as to seal the cavity (22). See, for example, the Abstract, Figure 9, and paragraphs [0015], [0018] and [0021] of Heck et al.

In the method of Applicants' claims, decomposed molecules of the thermally decomposed sacrificial layer **permeate through** the overcoat layer. Since the decomposed molecules permeate therethrough, the overcoat layer of Applicants' present claims is necessarily a continuous overcoat layer that is non-porous. Attention is further directed to the specification and drawing figures (e.g., Figure 3), in which the overcoat layer is depicted as being a continuous and non-porous overcoat layer.

Heck et al. provides no disclosure or suggestion with regard to a method of producing a microelectromechanical device package that involves decomposed molecules of the thermally decomposed sacrificial layer **permeating through** a previously applied overcoat layer, which is continuous and non-porous.

On pages 7 and 8 of the Office Action it is argued, with regard to claim 50, that Heck et al. inherently embodies Applicant's claimed decomposition temperature of the sacrificial material being less than 100°C. Applicants respectfully disagree, and submit that Heck et al. discloses and teaches decomposition temperatures of greater than 350°C, such as 425°C. See paragraph [0015] of Heck et al. As such, Heck et al. disclose and teach decomposition temperatures that are at least 3.5 times greater than the decomposition temperature of Applicants' present claim 50. In light of such teaching, it is further submitted that the disclosure of Heck et al. cannot reasonably embody, inherently or otherwise, Applicants' claimed decomposition temperature of the sacrificial material being less than 100°C.

In light of the preceding remarks, Applicants' claims are believed to be unanticipated by and patentable over Heck et al. Reconsideration and withdrawal of the present rejection are respectfully requested.

Obviousness Rejections:

Heck et al. in view of Freidhoff, Claims 27-29:

Claims 27-29 stand rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck et al. in view of United States Patent Application Publication No. US 2003/0155643 A1 (**Freidhoff**). This rejection is respectfully traversed in light of the following remarks.

Freidhoff discloses a method of manufacturing a microelectromechanical systems device that includes: forming a first sacrificial layer (40) on a substrate (24); forming a moving member (44) on the first sacrificial layer (40); forming a second sacrificial layer (50) over the moving member (44); forming a cover (54) over the second sacrificial layer (50); and removing the first and second sacrificial layers through opening (56) in the cover (54). The first and second sacrificial layers are removed by means of an agent (e.g., a solvent, stripper or reactive gas) that is introduced through the opening (56) in the cover (54). The cover (54) may be a film of silicon oxynitride, formed by PECVD. See, for example, the Abstract; Figure 7; and paragraphs [0022]-[0027] and [0032] of Freidhoff.

Heck et al. has been discussed previously herein, and relates to forming a cavity by thermally decomposing thermally decomposable layers, in which the thermally decomposed layers pass through a perforated or porous cover to form the cavity.

Freidhoff provides no disclosure, teaching or suggestion with regard to thermally decomposing the sacrificial layers thereof. As such, since Heck et al. and Freidhoff are directed to disparate methods of forming cavities, neither provides the requisite disclosure that would motivate a skilled artisan to combine them in an attempt to somehow arrive at the method of Applicants' present claims.

Even if Heck et al. and Freidhoff were combined, such a combination would necessarily result in a method that involves sacrificial material **passing through** a cover having openings therein, or a porous cover. As such, the combination of Heck et al. and Freidhoff would not, as it could not, result in Applicants' presently claimed method, which involves decomposed molecules of the thermally decomposed sacrificial layer **permeating through** a previously applied overcoat layer, which is continuous and non-porous.

In light of the preceding remarks, Applicants' claims are believed to be unobvious and patentable over Heck et al. in view of Freidhoff. Reconsideration and withdrawal of the present rejection are respectfully requested.

Heck et al. in view of Gallagher et al., Claim 37:

Claim 37 stands rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck et al. in view of United States Patent Application Publication No. US 2004/0137728 A1 (**Gallagher et al.**). This rejection is respectfully traversed in light of the following remarks.

Gallagher et al. discloses a method of forming air gaps within a solid structure that includes: forming a dielectric layer (10) on a substrate (5); forming metal lines (15) on the dielectric layer (10); disposing a sacrificial material (20) on the dielectric layer (10) and between metal lines (15); disposing a **porous overlayer** (25) over the sacrificial material (20) and metal lines (15); and decomposing the sacrificial material (20) by heating, resulting in the formation of volatile fragments that **pass through** the **porous overlayer** (25), thereby forming air gaps (21). See, for example, Figures 1A-1D; and paragraphs [0021], [0048] and [0061] of Gallagher et al.

Heck et al. has been discussed previously herein, and relates to forming a cavity by thermally decomposing thermally decomposable layers, in which the thermally decomposed layers pass through a perforated or porous cover to form the cavity.

Gallagher et al. does not serve to overcome the deficiencies of Heck et al. The combination of Heck et al. and Gallagher et al. would necessarily result in a method that involves decomposed material **passing through** a **porous overlayer**. As such, the combination of Heck et al. and Gallagher et al. would not, as it could not, result in Applicants' presently claimed method, which involves decomposed molecules of the thermally decomposed sacrificial layer **permeating through** a previously applied overcoat layer, which is continuous and non-porous.

On pages 10 and 11 of the Office Action, it is argued that Gallagher et al. discloses forming a released mechanical structure before the sacrificial material is formed. Applicants disagree and respectfully submit that this represents a mischaracterization of Gallagher et al. The metal lines (15) of the solid structure disclosed by Gallagher et al. are not

and do not reasonably represent free-standing or released mechanical structures, since they are each held abuttingly between dielectric layer (10) and porous overlayer (25). See, for example, Figures 1A through 1D of Gallagher et al. For purposes of comparative illustration, attention is directed to the micro electro-mechanical system device package (100) depicted in Figure 1 of Applicants' specification, which includes a free-standing or released micro electro-mechanical system structure (110). See also, paragraph [0025] on page 4 of Applicants' specification.

In light of the preceding remarks, Applicants' claims are believed to be unobvious and patentable over Heck et al. in view of Gallagher et al. Reconsideration and withdrawal of the present rejection are respectfully requested.

Heck et al. in view of Silverbrook, Claims 38-39:

Claims 38 and 39 stand rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck et al. in view of United States Patent Application Publication No. US 2003/0122227 A1 (**Silverbrook**). This rejection is respectfully traversed in light of the following remarks.

Silverbrook discloses a micro-machined accelerometer package that includes a hollow molded protective cap (e.g., 201) that is subsequently bonded to the surface of a pre-existing accelerometer so as to resultantly define a cavity therebetween, in which a cantilevered mass may move. The micro-machined accelerometer package of Silverbrook may also include a copper lead frame, and a protective layer encapsulating the entire assembly (e.g., Figure 23). See, for example, the Abstract, paragraphs [0001], [0003]-[0008], [0068] and [0069], and Figure 23 of Silverbrook.

Heck et al. has been discussed previously herein, and relates to forming a cavity by thermally decomposing thermally decomposable layers, in which the thermally decomposed layers pass through a perforated or porous cover to form the cavity.

Silverbrook discloses the subsequent placement and bonding of a previously molded hollow protective cap onto the surface of a pre-existing accelerometer, so as to resultantly define a cavity therebetween, in which a cantilevered mass may move. Silverbrook provides no disclosure or teaching with regard to forming a cavity of thermal decomposition of

thermally decomposable layers. As such, neither Heck et al. nor Silverbrook provide the requisite disclosure that would motivate a skilled artisan to combine or otherwise combine their disclosures in an attempt to somehow arrive at Applicants' claimed method.

Silverbrook does not address or otherwise overcome the deficiencies of Heck et al. The combination of Heck et al. and Silverbrook would necessarily result in a method that involves decomposed material **passing through** a **perforated or porous cover**. As such, the combination of Heck et al. and Silverbrook would not, as it could not, result in Applicants' presently claimed method, which involves decomposed molecules of the thermally decomposed sacrificial layer **permeating through** a previously applied overcoat layer, which is continuous and non-porous.

In light of the preceding remarks, Applicants' claims are believed to be unobvious and patentable over Heck et al. in view of Silverbrook. Reconsideration and withdrawal of the present rejection are respectfully requested.

Heck et al. in view of Partridge et al., Claims 41 and 42:

Claims 41 and 42 stand rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck et al. in view of United States Patent Application Publication No. US 2004/0245586 A1 (**Partridge et al.**). This rejection is respectfully traversed in light of the following remarks.

Partridge et al. discloses forming microelectromechanical systems and devices that include inorganic encapsulating layers (e.g., 28a, 28b, and 28c) which reside above an underlying substrate (e.g., 14). The microelectromechanical systems and devices of Partridge et al. include structures that are interposed between the inorganic encapsulating layers and the underlying substrate, such as a field area (22), a contact area (24) and a non-etched inorganic sacrificial layer (30). Partridge et al. discloses etching and removing sacrificial layers (e.g., 30 and 32) through vents (e.g., 36). See, for example, the Abstract; paragraphs [0001], [0010], [0046]-[0048], [0056], and [0092]-[0093]; and Figures 3 and 12 of Partridge et al.

Heck et al. has been discussed previously herein, and relates to forming a cavity by thermally decomposing thermally decomposable layers, in which the thermally decomposed layers pass through a perforated or porous cover to form the cavity.

Partridge et al. discloses etching and removing sacrificial layers (e.g., 30 and 32) through vents, and provides no disclosure or teaching with regard to thermal decomposition of the sacrificial layers. As such, neither Heck et al. nor Partridge et al. provide the requisite disclosure that would motivate a skilled artisan to combine or otherwise modify their disclosures in an attempt to somehow arrive at Applicants' claimed method.

Partridge et al. does not address or otherwise overcome the deficiencies of Heck et al. Even if Heck et al. and Partridge et al. were combined, the method of Applicants' claims would not result therefrom. Such a combination would necessarily result in a method that involves sacrificial material **passing through** a cover having vents therein, or a porous cover. As such, the combination of Heck et al. and Partridge et al. would not, as it could not, result in Applicants' presently claimed method, which involves decomposed molecules of the thermally decomposed sacrificial layer **permeating through** a previously applied overcoat layer, which is continuous and non-porous.

Applicants respectfully submit that the remarks on page 13 of the Office Action with regard to claim 42 represent a mischaracterization of Partridge et al. Partridge et al. discloses forming an encapsulation layer (e.g., 28c) for purposes of sealing chamber (26) and thereby providing a barrier to the diffusion of a fluid (42) residing within chamber (26). See, for example, Figure 12 and paragraph [0094] of Partridge et al. As such, Heck et al. and Partridge et al., either alone or in combination, do not disclose or suggest the method of Applicants' present claims, which may further include under claim 42 the formation of a vacuum-packed enclosure around the gas cavity.

In light of the preceding remarks, Applicants' claims are believed to be unobvious and patentable over Heck et al. in view of Partridge et al. Reconsideration and withdrawal of the present rejection are respectfully requested.

Heck et al. and Partridge et al. in view of Silverbrook, Claims 43-45 and 47-49:

Claims 43-45 and 47-49 stand rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck et al. and Partridge et al. in view of Silverbrook.

Heck et al., Partridge et al., and Silverbrook have each been discussed previously herein. A lack of motivation to combine Heck et al. with Partridge et al. or Silverbrook et al., has been discussed previously herein. Partridge et al. discloses etching and removing sacrificial layers through vents. Silverbrook discloses the subsequent placement and bonding of a previously molded hollow protective cap onto the surface of a pre-existing accelerometer, so as to resultantly define a cavity therebetween, in which a cantilevered mass may move. Silverbrook provides no disclosure or teaching with regard to forming a cavity by removing sacrificial layers (e.g., by etching and removal through vents). As such, neither Partridge et al. nor Silverbrook provides the requisite disclosure that would motivate a skilled artisan to combine or otherwise modify their respective disclosures in an attempt to arrive at Applicants' claimed method.

Partridge et al. and/or Silverbrook do not overcome or otherwise address the deficiencies of Heck et al. The combination of Heck et al., Partridge et al. and Silverbrook would necessarily result in a method that involves sacrificial material **passing through** a cover having vents therein, or a porous cover. Heck et al., Partridge et al. and Silverbrook, alone or in any combination, do not disclose or teach Applicants' presently claimed method, which involves decomposed molecules of the thermally decomposed sacrificial layer **permeating through** a previously applied overcoat layer, which is continuous and non-porous.

In light of the preceding remarks, Applicants' claims are believed to be unobvious and patentable over Heck et al. and Partridge et al. in view of Silverbrook. Reconsideration and withdrawal of the present rejection are respectfully requested.

Heck et al. and Partridge et al. in view of Barth et al., Claim 46:

Claim 46 stands rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck et al. and Partridge et al. in view United States Patent Application Publication No. US 2006/0014374 A1 (**Barth et al.**).

Barth et al. discloses a layer arrangement and a process of forming the layer. arrangement that involves sequentially applying or forming a layered structure having decomposable structures (e.g., 112) between upper (e.g., 124) and lower (e.g., 104) layers, and thermally decomposing the decomposable structures to form cavities (e.g., 128) residing between the upper and lower layers. The lower layer (e.g., 104) and, accordingly, the whole layered structure, is formed over or on a silicon wafer (e.g., 100). See, for example, the abstract, Figures 1E, 1F and 1G, and paragraphs [0056] through [0062] of Barth et al.

Heck et al. and Partridge et al. have been discussed previously herein with regard to a lack of motivation to combine their disclosure, and the failure of such a combination to result in the method of Applicants' claimed method. Heck et al. and Partridge et al. relate to microelectromechanical system devices. Barth et al. provides no disclosure, teaching or suggestion with regard to encapsulating a microstructure, such as a microelectromechanical systems device, in a decomposable structure. As such, there is no motivation to combine Barth et al. with Heck et al. and/or Partridge et al.

In addition, a combination of Partridge et al. and Barth et al., would render the process of Partridge et al. inoperable. Partridge et al. discloses **sequentially** annealing the micromachined mechanical structure **after** the first (30) and second (32) sacrificial layers have been removed. See paragraph [0091] of Partridge et al. Barth et al. describes their process as necessarily involving performing an annealing process **concurrently** with removal of the sacrificial structure (112). See, for example, paragraph [0062] of Barth et al. In addition, Partridge et al. discloses that annealing the micromachined mechanical structure results in densifying and sealing of the permeable / semi-permeable first encapsulation layer (28a). As such, modifying Partridge et al. to include the concurrent annealing-sacrificial structure removal process of Barth et al. would render Partridge et al. inoperable, since such a concurrent annealing-sacrificial structure removal process would seal the first encapsulation layer (28a),

thus preventing removal of sacrificial structures, such as the first (30) and second (32) sacrificial layers, therethrough, as would be recognized by a skilled artisan.

Barth et al. does not address or otherwise overcome the deficiencies of Heck et al. and/or Partridge et al. Heck et al., Partridge et al. and Barth et al., alone or in any combination do not disclose or suggest the method of Applicants' claims.

In light of the preceding remarks, Applicants' claims are believed to be unobvious and patentable over Heck et al. and Partridge et al. in view of Barth et al. Reconsideration and withdrawal of the present rejection are respectfully requested.

Heck et al. in view of Chanchani, Claims 53 and 54:

Claims 53 and 54 stand rejected under 35 U.S.C. § 103(a) as being obvious and unpatentable over Heck et al. in view of United States Patent Application Publication No. US 2007/0158787 A1 (**Chanchani**). This rejection is respectfully traversed in light of the amendments herein and the following remarks.

Chanchani discloses a microsystem-on-a-chip device that includes, a bottom wafer (220), and an upper wafer (240), that are glued together by an interconnect layer (230) that includes a dielectric polymer (231). The microsystem-on-a-chip device includes interconnect circuitry (223, 232) and microsystems devices (222) that are **embedded** in the dielectric polymer (231) of the interconnect layer. See, for example, the Abstract, Figure 3, and paragraphs [0022]-[0027] and [0033] of Chanchani.

Heck et al. is directed to microelectromechanical systems, technology and devices. Chanchani is directed to microsystem-on-a-chip technology and devices. Chanchani provides no disclosure, teaching or suggestion with regard to microelectromechanical systems, technology and devices. Heck et al. provides no disclosure, teaching or suggestion with regard to microsystem-on-a-chip technology and devices. Chanchani provides no disclosure, teaching or suggestion with regard to forming a cavity (e.g., 22 of Heck et al.) that contains a microelectromechanical systems device (e.g., 18 of Heck et al.). Heck et al. and Chanchani are each directed to disparate and distinguishable technologies that are not applicable to each other, as would be recognized by a skilled artisan. As such, neither Heck et al. nor Chanchani provides

the requisite disclosure that would motivate a skilled artisan to combine or otherwise modify their disclosures in and attempt to somehow arrive at Applicants' presently claimed method.

Even if Heck et al. and Chanchani were combined, such a combination would provide an inoperable result, and, in particular, render Heck et al. inoperable for its intended purpose. A combination of Heck et al. and Chanchani would result in the microelectromechanical systems device (18) of Heck et al. being embedded in a dielectric polymer material, rather than residing in a cavity (22).

If proposed modifications render a reference inoperable for its intended purpose, then there is no suggestion or motivation to make the proposed modification, and, accordingly, the proposed modification would not be obvious. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Similarly, according to the MPEP, the claimed combination of references used to ground an obviousness rejection may not change the principle of operation of the primary reference or render the reference inoperable for its intended purpose. MPEP §§ 2143.01 and 2145(III).

As discussed above, a combination of Heck et al. and Chanchani would result in an inoperable microelectromechanical systems device in which the microelectromechanical systems device thereof is embedded in a dielectric polymer, rather than residing in a cavity, as would be recognized by a skilled artisan. As such, a combination of Heck et al. and Chanchani would not, as it could not, result in the method of Applicants' present claims.

Under the examination guidelines for determining obviousness under 35 U.S.C. § 103 of the Manual of Patent Examining Procedure (MPEP), "[a]scertaining the differences between the prior art and the claims at issue requires interpreting the claim language, and considering both the invention and the prior art references as a whole." MPEP § 2141.02, page 2100-123, Rev. 6, Sept. 2007. "In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious." MPEP §2141.02 (emphasis in original), citing: *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983).

Under MPEP § 2143.03, all claim limitations must be considered. "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). MPEP § 2143.03, page 2100-142, Rev. 6, Sept. 2007.

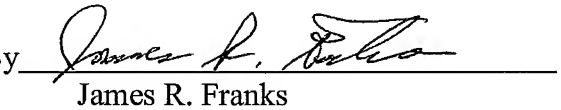
In light of the preceding remarks, Applicants' claims are believed to by unobvious and patentable over Heck et al. in view of Chanchani. Reconsideration and withdrawal of the present rejection are respectfully requested.

CONCLUSION

In light of the amendments herein and the preceding remarks, Applicants' presently pending claims are deemed to meet all the requirements of 35 U.S.C. §112, and to define an invention that is unanticipated, unobvious, and, hence, patentable. Reconsideration of the rejections and allowance of all of the presently pending claims are respectfully requested.

Respectfully submitted,

THE WEBB LAW FIRM

By 

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